

Note: Time allowed for Section – B and Section – C is 2 Hours and 45 minutes.

Section – B

Marks: 32

Answer any EIGHT parts. Each part carries FOUR marks

Q.1 What are the significant figures in the following measurement?

- (a) 1.009 m (b) 0.00450 kg
(c) 1.66×10^{-27} kg (d) 2.001 sec

Q.2 Define least count of a screw guage. How can we find least count of screw guage?

Q.3 Is it possible that displacement is zero but not the distance? Under what condition displacement will be equal to distance?

Q.4 A motorcyclist starts from rest and moves with uniform acceleration of 1.9 m/s^2 for 22s. Find (a) velocity and (b) distance covered.

Q.5 An iron shot of mass 6g is fired with an airgun. If the velocity of the shot is 62 ms^{-1} , what is the magnitude of momentum?

Q.6 Why a balloon filled with air move forward, when its air is released?

Q.7 How does friction help you walk? Is it kinetic friction or static friction?

Q.8 What is neutral equilibrium? How an object's stability can be improved?

Q.9 State first and second conditions of equilibrium.

Q.10 State Hooke's law and derive it mathematically.

Q.11 A 60 g bullet is fired from a gun with 3150 J of kinetic energy. Find its velocity

Section – C

Marks: 21

Note: Attempt any THREE questions. All questions carry equal marks.

Q.12 (a) Define momentum. Relate force to change in momentum. 4

(b) Sana is pulling a box on the floor with a force of 20 N making an angle of 60° with the horizontal. Find the horizontal and vertical components of this force. 3

Q.13 (a) Explain how value of g varies with altitude? 4

(b) Sana, whose mass is 43 kg, sits 1.8 m from the center of seesaw. Faiz, whose mass is 52 kg, wants to balance Sana. How far from the center of the seesaw should Faiz sit? 3

Q.14 (a) Use velocity-time graph to prove $S = v_1t + \frac{1}{2}at^2$ 4

(b) What power is required for a ski-hill chair lift that transports 500 people (average mass 65 kg) per hour to an increased elevation of 1200 m. 3

Q.15 (a) Explain thermal conductivity of a substance and its mathematical description. 4

(b) Find the amount of heat for melting the ice having mass 1.3 kg at -10°C ? 3
(Latent heat of fusion for ice $L_f = 3.3 \times 10^5 \text{ J/kg}$ and specific heat for ice $C = 2.2 \times 10^3 \text{ J/kgK}$)